



NEB-166-PUS.APP.txt  
SEQUENCE LISTING

<110> JACK, WALTER E.  
GARDNER, ANDREW  
BUZBY, PHILIP R.  
DIMEO, JAMES J.  
NEW ENGLAND BIOLABS, INC.  
NEN LIFE SCIENCE PRODUCTS, INC.

<120> INCORPORATION OF MODIFIED NUCLEOTIDES BY ARCHAEON DNA  
POLYMERASES AND RELATED METHODS

<130> NEB-166-PUS

<140> 10/089,027  
<141> 2002-03-26

<150> PCT/US00/26900  
<151> 2000-09-29

<150> 60/157,204  
<151> 1999-09-30

<160> 33

<170> PatentIn Ver. 2.0

<210> 1  
<211> 36  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
oligonucleotide

<400> 1  
caggcagagg cttataaaaa tcctcgccaa cagctt 36

<210> 2  
<211> 26  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
oligonucleotide

<400> 2  
ggtggcagca gccaaactcag cttcct 26

<210> 3  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
oligonucleotide

<400> 3  
gattctcatg ataagctacg ccga 24

<210> 4  
 <211> 5837  
 <212> DNA  
 <213> *Thermococcus litoralis*

<400> 4  
 gaattcgcga taaaatctat tttcttcctc catttttcaa tttcaaaaac gtaagcatga 60  
 gccaaacctc tcgccctttc tctgtccttc ccgctaacc tcttgaaaac tctctccaaa 120  
 gcattttttg atgaaagctc acgctcctct atgaggggtca gtatatctgc aatgagttcg 180  
 tgaaggggta ttctgtagaa caactccatg attttcgatt tggatggggg tttaaaaatt 240  
 tggcggaact tttatttaat ttgaactcca gtttatactt ggtggtattt atgatactgg 300  
 acactgatta cataacaaaa gatggcaagc ctataatccg aatttttaag aaagagaacg 360  
 gggagtttaa aatagaactt gaccctcatt ttcagcccta tatatatgct cttctcaaag 420  
 atgactccgc tattgaggag ataaaggcaa taaagggcga gagacatgga aaaactgtga 480  
 gagtgtctga tgcagtgaat gtcaggaaaa aatttttggg aagggaagtt gaagtctgga 540  
 agctcatttt cgagcatccc caagacgttc cagcatatgc gggcaaaaata agggaacatc 600  
 cagctgtggt tgacattttac gaatatgaca taccctttgc caagcgttat ctcatagaca 660  
 agggcttgat tccccgggag ggagacgagg agcttaagct ccttgccttt gatattgaaa 720  
 cgttttatca tgaggagat gaatttgga agggcgagat aataatgatt agttatgccg 780  
 atgaagaaga ggccagagta atcacatgga aaaatatcga tttgccgtat gtcgatgttg 840  
 tgtccaatga aagagaaatg ataaagcgtt ttgttcaagt tgttaaagaa aaagaccccc 900  
 atgtgataat aacttacaat ggggacaatt ttgatttgcc gtatctcata aaacggggcg 960  
 aaaagctggg agttcggcct gctttaggaa gggacaaaaga acatcccgaa cccaagattc 1020  
 agaggatggg tgatagtttt gctgtggaaa tcaagggtag aatccacttt gatcttttcc 1080  
 cagttgtgct aaggacgata aacctcccaa cgtatacgtc tgaggcagtt tatgaagcag 1140  
 ttttaggaaa aacccaaaagc aaattaggag cagaggaaat tgccgctata tgggaaacag 1200  
 aagaaagcat gaaaaaacta gcccagtaac caatggaaga tgctagggca acgtatgagc 1260  
 tcgggaagga attcttcccc atggaagctg agctggcaaa gctgataggt caaagtgtat 1320  
 gggcagcttc gagatcaagc accggcaacc tcgtggagtg gtatctttta aggggtggcat 1380  
 acgcgaggaa tgaacttgca ccgaacaaac ctgatgagga agagtataaa cggcgcttaa 1440  
 gaacaactta cctgggagga tatgtaaaag agccagaaaa aggtttgtgg gaaaatatca 1500  
 tttatttgga tttccgcagt ctgtaccctt caataatagt tactcacaac gtatccccag 1560  
 atacccttga aaaagagggc tgtaagaatt acgatgttgc tccgatagta ggatataggt 1620  
 tctgcaagga ctttccgggc tttattccct ccatactcg ggacttaatt gcaatgaggc 1680  
 aagatataaa gaagaaaatg aaatccacaa ttgaccgat cgaaaaagaa atgctcgatt 1740  
 ataggcaag ggctattaaa ttgcttgcaa acagcatctt acccaacgag tggttaccaa 1800  
 taattgaaaa tggagaaata aaattcgtga aaattggcga gtttataaac tcttacatgg 1860  
 aaaaacagaa ggaaaacgtt aaaacagtag agaatactga agttctcgaa gtaaacacac 1920  
 tttttgcatt ctcatccaac aaaaaaatca aagaaagtga agtcaaaaaa gtcaaaagccc 1980  
 tcataagaca taagtataaa gggaaagctt atgagattca gcttagctct ggtagaaaaa 2040  
 ttaacataac tgctggcctt agtctgttta cagttagaaa tggagaaata aagggaagtt 2100  
 ctggagatgg gataaaagaa ggtgacctta ttgtagcacc aaagaaaatt aaactcaatg 2160  
 aaaaaggggt aagcataaac attcccagat taatctcaga tctttccgag gaagaaacag 2220  
 ccgacattgt gatgacgatt tcagccaagg gcagaaagaa cttctttaaa ggaatgctga 2280  
 gaactttaag gtggatgttt ggagaagaaa atagaaggat aagaacattt aatcgctatt 2340  
 tgttccatct cgaaaaaacta ggccttatca aactactgcc ccgcggatat gaagttactg 2400  
 actgggagag attaaagaaa tataaacaaac tttacgagaa gcttgctgga agcgtttaagt 2460  
 acaacggaaa caagagagag tatttagtaa tgttcaacga gatcaaggat tttatatctt 2520  
 acttcccaca aaaagagctc gaagaatgga aaattggaac tctcaatggc tttagaacga 2580  
 attgtattct caaagtcgat gaggattttg ggaagctcct aggttactat gttagtggag 2640  
 gctatgcagg tgcacaaaaa aataaaactg gtggtatcag ttattcgggtg aagctttaca 2700  
 atgagaccg taatgttctt gagagcatga aaaatgttgc agaaaaattc tttggcaagg 2760  
 ttagagttga cagaaattgc gtaagtatat caaagaagat ggcatactta gttatgaaat 2820  
 gcctctgtgg agcattagcc gaaaacaaga gaattccttc tgttatactc acctctcccc 2880  
 aaccggtagc gtggtcattt ttagaggcgt attttacagg cgatggagat atacatccat 2940  
 caaaaagggt taggctctca acaaaaagcg agctccttgc aaatcagctt gtgttcttgc 3000  
 tgaactcttt gggaaatatc tctgtaaaga taggctttga cagtggggtc tatagagtgt 3060  
 atataaatga agacctgcaa tttccacaaa cgtctaggga gaaaaacaca tactactcta 3120  
 acttaattcc caaagagatc cttaggggag tgtttggaaa agagttccaa aagaacatga 3180  
 cgttcaagaa atttaaagag cttgttgact ctggaaaact taacagggag aaagccaagc 3240  
 tcttgaggtt cttcattaat ggagatattg tccttgacag agtcaaaagt gttaaagaaa 3300  
 aggactatga agggatgtgc tatgacctaa gcgttgagga taacgagaac tttcttgttg 3360  
 gttttggttt gctctatgct cacaacagct attacggcta tatggggtat cctaaggcaa 3420

NEB-166-PUS.APP.txt

```

gatgggtactc gaaggaatgt gctgaaagcg ttaccgcatg ggggagacac tacatagaga 3480
tgacgataag agaaatagag gaaaagttcg gctttaaggt tctttatgcg gacagtgtct 3540
caggagaaag tgagatcata ataaggcaaa acggaaagat tagattttgtg aaaataaagg 3600
atcttttctc taaggtggac tacagcattg gcgaaaaaga atactgcatt ctcgaagggtg 3660
ttgaagcact aactctggac gatgacggaa agcttgtctg gaagcccgtc ccctacgtga 3720
tgaggcacag agcgaataaa agaattgttc gcactctggct gaccaacagc tggatatatag 3780
atgttactga ggatcattct ctcataggct atctaaacac gtcaaaaacg aaaactgcca 3840
aaaaaatcgg ggaaagacta aaggaagtaa agccttttga attaggcaaa gcagtaaaat 3900
cgctcatatg cccaaatgca ccgttaaagg atgagaatac caaaactagc gaaatagcag 3960
taaaattctg ggagctcgta ggattgattg taggagatgg aaactggggt ggagattctc 4020
gttgggcaga gtattatctt ggactttcaa caggcaaga tgcagaagag ataaagcaaa 4080
aacttctgga acccctaaaa acttatggag taatctcaaa ctattacca aaaaacgaga 4140
aaggggactt caacatcttg gcaaagagcc ttgtaaagtt tatgaaaagg cactttaagg 4200
acgaaaaagg aagacgaaaa attccagagt tcatgtatga gcttccggtt acttacatag 4260
aggcatttct acgaggactg ttttcagctg atgggtactgt aactatcagg aagggagttc 4320
cagagatcag gctaacaagt attgatgtcg actttctaag ggaagtaagg aagcttctgt 4380
ggattgttgg aatttcaaat tcaatatttg ctgagactac tccaaatcgc tacaatggtg 4440
tttctactgg aacctactca aagcatctaa ggatcaaaaa taagtggcgt tttgctgaaa 4500
ggataggctt tttaatcgag agaaagcaga agagactttt agaacattta aaatcagcga 4560
gggtaaaaag gaataccata gattttggct ttgatcttgt gcatgtgaaa aaagtccaag 4620
agataccata cgagggttac gtttatgaca ttgaagtcga agagacgcat aggttctttg 4680
caaacaacat cctgggtacg aatactgacg gcttttatgc cacaataccg ggggaaaagg 4740
ctgaactcat taaaaagaaa gccaaaggaat tcctaaacta cataaactcc aaacttccag 4800
gtctgcttga gcttgagtat gagggccttt acttgagagg attctttgtt acaaaaaagc 4860
gctatgcagt catagatgaa gagggcagga taacaacaag gggcttggaa gtagtaagga 4920
gagattggag tgagatagct aaggagactc aggcaaaggt ttagagggtt atacttaaag 4980
aggggaagtgt tgaaaaagct gtagaagttg ttagagatgt ttagagaaa atagcaaaat 5040
acagggttcc acttgaaaag cttgttatcc atgagcagat taccagggtt ttaaaggact 5100
acaaagccat tggccctcat gtcgcatag caaaaagact tgccgcaaga gggataaaag 5160
tgaaaccggg cacaataata agctatatcg ttctcaaagg gagcggaaag ataagcgata 5220
gggtaat ttttactagaa tacgatccta gaaaacacaa gtacgatccg gactactaca 5280
tagaaaacca agttttgccc gcagtactta ggatactcga agcgttttga tacagaaagg 5340
aggatttaag gtatcaaagc tcaaaacaaa ccggcttaga tgcattggctc aagaggtagc 5400
tctgttgcct tttagtccaa gtttctccgc gactctctct atctctcttt tgtattctgc 5460
tatgtggttt tcattcacta ttaagtagtc cgccaaagcc ataacgcttc caattccaaa 5520
cttgagctct ttcagctctc tggcctcaaa ttcactccat gtttttggat cgtcgcttct 5580
ccctcttctg ctaagcctct cgaatctttt tcttggcgaa gagtgtacag ctatgatgat 5640
tatctcttcc tctggaaacg catctttaa cgtctgaatt tcatctagag acctcactcc 5700
gtcgattata actgccttgt acttctttag tagttctttt accttggga tcgttaattt 5760
tgccacggca ttgtcccaa gctcctgcct aagctgaatg ctcaactgt tcataccttc 5820
gggagttctt gggatcc 5837

```

<210> 5

<211> 15

<212> PRT

<213> *Thermococcus litoralis*

<400> 5

Ala Ile Lys Leu Leu Ala Asn Ser Tyr Tyr Gly Tyr Met Gly Tyr  
1 5 10 15

<210> 6

<211> 15

<212> PRT

<213> *Pyrococcus Sp.* (GB-D)

<400> 6

Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 7

<211> 15  
 <212> PRT  
 <213> Thermococcus sp.

<400> 7  
 Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr  
     1                    5                    10                    15

<210> 8  
 <211> 15  
 <212> PRT  
 <213> Pyrococcus furiosus

<400> 8  
 Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr  
     1                    5                    10                    15

<210> 9  
 <211> 15  
 <212> PRT  
 <213> Thermococcus fumicolans

<400> 9  
 Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr  
     1                    5                    10                    15

<210> 10  
 <211> 15  
 <212> PRT  
 <213> Thermococcus gorgonarius

<400> 10  
 Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr  
     1                    5                    10                    15

<210> 11  
 <211> 15  
 <212> PRT  
 <213> Thermococcus sp. (TY)

<400> 11  
 Ala Val Lys Leu Leu Ala Asn Ser Tyr Tyr Gly Tyr Met Gly Tyr  
     1                    5                    10                    15

<210> 12  
 <211> 15  
 <212> PRT  
 <213> Pyrococcus abyssi

<400> 12  
 Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr  
     1                    5                    10                    15

<210> 13  
 <211> 15  
 <212> PRT  
 <213> Pyrococcus glycovaorans

NEB-166-PUS.APP.txt

<400> 13

Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 14

<211> 15

<212> PRT

<213> Pyrococcus horikoshii

<400> 14

Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 15

<211> 15

<212> PRT

<213> Pyrococcus sp. (GE23)

<400> 15

Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 16

<211> 15

<212> PRT

<213> Pyrococcus Sp. (KOD1)

<400> 16

Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 17

<211> 15

<212> PRT

<213> Pyrococcus woesei

<400> 17

Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr  
1 5 10 15

<210> 18

<211> 15

<212> PRT

<213> Archaeoglobus fulgidus

<400> 18

Thr Leu Lys Val Leu Thr Asn Ser Phe Tyr Gly Tyr Met Gly Trp  
1 5 10 15

<210> 19

<211> 15

<212> PRT

<213> Cenarchaeum symbiosum

<400> 19

Ala Leu Lys Val Val Leu Asn Ala Ser Tyr Gly Val Met Gly Ala  
Page 5

1 5 10 15

<210> 20  
 <211> 15  
 <212> PRT  
 <213> Methanococcus jannaschii

<400> 20  
 Ser Ile Lys Ile Leu Ala Asn Ser Val Tyr Gly Tyr Leu Ala Phe  
 1 5 10 15

<210> 21  
 <211> 15  
 <212> PRT  
 <213> Methanococcus voltae

<400> 21  
 Ser Ile Lys Val Leu Ala Asn Ser His Tyr Gly Tyr Leu Ala Phe  
 1 5 10 15

<210> 22  
 <211> 15  
 <212> PRT  
 <213> Pyrodictium occultum

<400> 22  
 Ala Leu Lys Val Leu Ala Asn Ala Ser Tyr Gly Tyr Met Gly Trp  
 1 5 10 15

<210> 23  
 <211> 15  
 <212> PRT  
 <213> Sulfurisphaera ohwakuensis

<400> 23  
 Ala Met Lys Val Phe Ile Asn Ala Thr Tyr Gly Val Phe Gly Ala  
 1 5 10 15

<210> 24  
 <211> 15  
 <212> PRT  
 <213> Sulfolobus acidocaldarius

<400> 24  
 Ala Met Lys Val Phe Ile Asn Ala Thr Tyr Gly Val Phe Gly Ala  
 1 5 10 15

<210> 25  
 <211> 15  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 25  
 Ala Met Lys Val Phe Ile Asn Ala Thr Tyr Gly Val Phe Gly Ala  
 1 5 10 15

<210> 26  
 <211> 15  
 <212> PRT  
 <213> Herpesvirus

<400> 26  
 Ala Ile Lys Val Val Cys Asn Ser Val Tyr Gly Phe Thr Gly Val  
     1                    5                    10                    15

<210> 27  
 <211> 15  
 <212> PRT  
 <213> human herpesvirus 2

<400> 27  
 Ala Ile Lys Val Val Cys Asn Ser Val Tyr Gly Phe Thr Gly Val  
     1                    5                    10                    15

<210> 28  
 <211> 15  
 <212> PRT  
 <213> Human cytomegalovirus

<400> 28  
 Ala Leu Lys Val Thr Cys Asn Ala Phe Tyr Gly Phe Thr Gly Val  
     1                    5                    10                    15

<210> 29  
 <211> 15  
 <212> PRT  
 <213> Human DNA Polymerase alpha

<400> 29  
 Ala Leu Lys Leu Thr Ala Asn Ser Met Tyr Gly Cys Leu Gly Phe  
     1                    5                    10                    15

<210> 30  
 <211> 15  
 <212> PRT  
 <213> Phage T4

<400> 30  
 Asn Arg Lys Ile Leu Ile Asn Ser Leu Tyr Gly Ala Leu Gly Asn  
     1                    5                    10                    15

<210> 31  
 <211> 635  
 <212> DNA  
 <213> Consensus using 9 degrees N or AmpliTaq

<220>  
 <221> misc\_feature  
 <222> (2)..(3)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature

<222> (5)..(5)  
<223> s is g or c

<220>  
<221> misc\_feature  
<222> (11)..(12)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (14)..(14)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (18)..(18)  
<223> s is g or c

<220>  
<221> misc\_feature  
<222> (28)..(28)  
<223> s is g or c

<220>  
<221> misc\_feature  
<222> (35)..(35)  
<223> k is g or t

<220>  
<221> misc\_feature  
<222> (39)..(39)  
<223> k is g or t

<220>  
<221> misc\_feature  
<222> (46)..(46)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (63)..(63)  
<223> y is c or t

<220>  
<221> misc\_feature  
<222> (77)..(77)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (84)..(84)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (128)..(128)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (152)..(152)  
<223> n is a, c, g, or t



NEB-166-PUS.APP.txt

<220>  
 <221> misc\_feature  
 <222> (372)..(372)  
 <223> y is c or t

<220>  
 <221> misc\_feature  
 <222> (518)..(518)  
 <223> m is a or c

<220>  
 <221> misc\_feature  
 <222> (530)..(530)  
 <223> m is a or c

<220>  
 <221> misc\_feature  
 <222> (544)..(544)  
 <223> k is g or t

<220>  
 <221> misc\_feature  
 <222> (565)..(565)  
 <223> w is a or t

<220>  
 <221> misc\_feature  
 <222> (587)..(588)  
 <223> k is g or t

<220>  
 <221> misc\_feature  
 <222> (593)..(593)  
 <223> w is a or t

<220>  
 <221> misc\_feature  
 <222> (596)..(596)  
 <223> m is a or c

<220>  
 <221> misc\_feature  
 <222> (616)..(616)  
 <223> k is g or t

<220>  
 <221> misc\_feature  
 <222> (621)..(621)  
 <223> k is g or t

<400> 31  
 tnntsggaaa nncnggcsat tgccaatstt gcatkcctkc aggtcngact ctagaggatc 60  
 ccygggtacc gagctcngaa ttcnctaatac atggatcatag ctgtttcctt gtgtgaaatt 120  
 gttatccngc tcacaattcc acacaacata cngagccgga agcataaagt gtaaagcctg 180  
 ggggtgcctaa tgagtgcgct aactcacatt aattgcgttg cgctcacttg cccgctttcc 240  
 agtcgggaaa cctgtcgtgc cagctgcatt aatgaatcgg ccggagaggc gggttgcgta 300  
 ttgggagcca ggggtggtttt tcttttcacc agtgagacgg gcaacagctg attgcccttc 360

## NEB-166-PUS.APP.txt

accgcctggc cytgagagag ttgcagcaag cgggtccacgc tggtttgccc cagcaggcga 420  
 aaatatggtg gttccgaaat cggcaaaatc ccttataaat caaaagaata gccccgagat 480  
 aggggttgaag tgttggtcca gtttggaaca agagtccmct attaaagaam gtggactcca 540  
 acgkcaaagg gcgaaaaacc gtctwtcagg ggcgatggcc actacgkkaa ccwtcmccta 600  
 atcaagtttt tggggkcgag kggccgttaa gccta 635

<210> 32  
 <211> 615  
 <212> DNA  
 <213> M13mp18 bacteria phage DNA

<220>  
 <221> misc\_feature  
 <222> (2)..(3)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (6)..(6)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (21)..(21)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (468)..(468)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (532)..(532)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (535)..(535)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (560)..(560)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (577)..(577)  
 <223> n is a, c, g, or t

<400> 32  
 tnntcnacgg ccattgccaa ncttgcatgc ctgcaggctg actctagagg atccccgggt 60  
 accgagctcg aattcgtaat catggtcata gctgtttcct gtgtgaaatt gttatccgct 120  
 cacaattcca cacaacatac gagccggaag cataaagtgt aaagcctggg gtgcctaagt 180

NEB-166-PUS.APP.txt

agtgagctaa ctcacattaa ttgcgttgcg ctcaactgccc gctttccagt cgggaaacct	240
gtcgtgccag ctgcattaat gaatcggccg gagaggcggg ttgcgtattg ggcgccaggg	300
tggtttttct tttcaccagt gagacgggca acagctgatt gcccttcacc gcctggccct	360
gagagagttg cagcaagcgg tccacactgg tttgccccag caggcgaaaa tatggtggtt	420
ccgaaatcgg caaaatccct tataaatcaa aagaatagcc cgagatangg ttgaagtgtt	480
gttccagttt ggaacaagag tccactatta aagaaagtgg actccaacgt cnaanggcga	540
aaaaccgtct atcaggggcn atggccacta cgttaancat caccaatcaa tttttggggt	600
cagtgcctaa gccta	615

<210> 33  
 <211> 602  
 <212> DNA  
 <213> M13mp18 bacteria phage DNA

<220>  
 <221> misc\_feature  
 <222> (8)..(9)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (11)..(11)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (20)..(20)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (26)..(27)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (31)..(31)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (35)..(35)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (40)..(40)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (46)..(46)  
 <223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (60)..(60)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (68)..(68)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (75)..(75)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (119)..(119)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (124)..(124)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (132)..(132)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (139)..(139)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (143)..(143)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (173)..(174)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (194)..(194)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (196)..(196)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (210)..(210)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature

<222> (213)..(213)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (220)..(220)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (246)..(246)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (252)..(252)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (297)..(297)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (326)..(326)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (329)..(329)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (342)..(342)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (349)..(349)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (365)..(365)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (368)..(368)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (378)..(378)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (419)..(419)  
<223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (428)..(428)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (435)..(435)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (454)..(454)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (502)..(502)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (537)..(537)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (551)..(551)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (571)..(571)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (597)..(597)  
 <223> n is a, c, g, or t

<400> 33  
 tgggaaannc nggcgagccn atgttnnatt ncttnaggcn gctctngagg atccctgggn 60  
 ccggctcnga attcngtaat catggtcata gctgtttcct tgtgtgaaat tgttatccng 120  
 ctncnaattc cncacaacht acngagccgg aagctaaagt gtaaagctgg ggnnctaata 180  
 agtgagctaa ctncnhttaa ttgcgttgcn tcncttgccn gtttccagtc gggaaactgt 240  
 cgtgcngctg cnttaatgaa tcggccggag aggcgggttg cgtattgggc gcagggnggt 300  
 ttttcttttc accagtgaga cgggcnacng tgattgcctt cncgctgnc cttgagagag 360  
 ttgcngcnag cgggtcccntg gtttgcccag cagggaaaat atggtggtcc gaaatcggna 420  
 aatccttnta aatcnaaaga atagccccga gatnggggttg agtggtgtcc agtttggaac 480  
 aagagcccct attaaagaac gnngactcca acggcaaagg gcgaaaaacc gctttcnggg 540  
 cgatggccct ncggaacct tcccctaatac nagtttttgg gggcgagggg ccggttangcc 600  
 ta 602

NEB-166-PUS.APP.txt